

Aciotis (Melastomataceae): Two New Species from the Northwestern Lowlands of South America

Alina Freire-Fierro

Herbario Nacional del Ecuador QCNE, Av. Río Coca E6-115 e Isla Fernandina, Apartado 17-21-1787, Quito, Ecuador. Present address: Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63110-0299, U.S.A. <http://www.joethejuggler.com/Alina>

ABSTRACT. Two new species are described in the neotropical genus *Aciotis*. *Aciotis wurdackiana* is an herbaceous species with narrow chartaceous leaves, a dense cymose inflorescence, and chartaceous ovary walls, and is distributed in the northern state of Pará in Brazil. *Aciotis olivieriana* is an herbaceous species characterized by cordate and papery leaves, a lax cymose inflorescence, and coriaceous ovary walls, and is distributed in the lowlands of northwestern South America.

RESUMEN. Se describen dos nuevas especies del género neotropical *Aciotis*. *Aciotis wurdackiana* es una especie herbácea con hojas angostas cartáceas, inflorescencia cimosa densa, paredes del ovario cartáceas, y distribuida únicamente en el estado de Pará al norte del Brasil. *Aciotis olivieriana* es una especie herbácea caracterizada por las hojas cordadas y papiráceas, inflorescencia cimosa laxa, paredes del ovario coriáceas y distribuida en las tierras bajas del noroeste de América del Sur.

Key words: *Aciotis*, Brazil, Colombia, Ecuador, Melastomataceae, Peru, South America, Venezuela.

Aciotis D. Don, a typical melastome in its opposite leaves with palmate-parallel venation and cymose inflorescences, is a neotropical genus of 13 species (Freire-Fierro, in press) characterized by an herbaceous habit, with or without spiral tracheids, small actinomorphic flowers, stamens lacking dorsal connectives, and fruits either dry or fleshy. *Aciotis* species occur primarily in humid lowlands from Mexico through Brazil in disturbed habitats such as abandoned fields and secondary forests. They also grow in wetlands and swamps, and are less often found in primary forests or in dry sandy areas. Some species of *Aciotis*, like species of *Desmoscelis* Naudin, *Brachyotum* (DC.) Hooker f., *Pterolepis* (DC.) Miquel, and *Tibouchina* Aublet have prosenchymatous shaggy trichomes with sclerenchyma fibers borne at their bases that run subepidermically on the lower surface of the leaves giving a root-like appearance (Solereder, 1908). These running sclerenchyma fibers give the lower surface the

appearance of web-like striations. The spiral tracheids observed in the mesophyll of leaves of *Aciotis wurdackiana* have previously been observed in *Aciotis annua* (Martius ex DC.) Triana (Solereder, 1908), and in species of *Bellucia* Necker ex Rafinesque, *Henriettea* DC., and *Sonerila* Roxburgh (Metcalfe & Chalk, 1972).

Cogniaux (1891) and Renner (1993) have placed *Aciotis* in the tribe Melastomeae [Tibouchineae] because of the cochleate seeds and the presence of capsular fruits in several species.

In anticipation of the revision of the genus (Freire-Fierro, in press), two new species are published here. *Aciotis wurdackiana* comes from the Amazonian lowlands of Brazil, and *A. olivieriana* occurs in the lowlands of Brazil, Colombia, Ecuador, and Venezuela. Both species had been previously named by Mathies in an unpublished doctoral thesis (Mathies, 1981). Through my revision and study of more material and gathering of new data, I am able to validate some of his results.

***Aciotis wurdackiana* Freire-Fierro, sp. nov.**

TYPE: Brazil. Pará: Rio Trombetas, vicinity of Cachoeira Porteira 01°55'S, 55°50'W, 21 May 1974, G. T. Prance, D. G. Campbell, J. C. Ongley, J. F. Ramos, O. P. Monteiro & B. W. Nelson 22220 (holotype, INPA; isotypes, AAU, F, GH, K, MO [sheet 3489413], NY, S). Figure 1.

Planta erecta, caule trichomatibus eglandulosis pilosulo, glabrescente; xylemate tracheidis spiraliformibus praedita. Folia elliptica, subtus striis retiformibus ornata. Inflorescentia ex cyma duplo bipara constans; bracteis conspicuis. Fructus capsularis. Haec species ab *A. annua* caule glabrescente, foliis ellipticis 3- ad 5-nervatis (nec 5- ad 7-nervatis) perangustioribus minoribusque atque petalis anguste ellipticis (nec obovatis) differt.

Plant approximately 0.4 m high, erect; stolons absent; stem quadrangular with inconspicuous wings, glabrescent, initially with eglandular trichomes < 1 mm long. Leaves with petiole 0.2–0.9 cm long, unwinged, eglandular-pubescent with trichomes > 1 mm long; blade 1.2–3.1 × 0.6–1.4




Figure 1. *Aciotis wurdackiana* Freire-Fierro. —A. Habit. —B. Leaf. —C. Stem. —D. Lower surface of leaf showing web-like striations. —E. Upper surface of leaf. —F. Inflorescence section. —G. Capsular fruit with glandular ovary apex. —H. Seed with foveolate testa. (A–F based on Prance 22220; G–H from Campbell et al. P22526.)

cm, papery, elliptic, 3- to 5-veined, the base cuneate to truncate, the apex acute, the margin serrulate; upper leaf surface dark green, pilosulous with eglandular trichomes, lower surface whitish green due to prosenchymatous sclerenchyma fibers, pubescent with eglandular trichomes with root-like sclerenchyma fibers. Inflorescence a simple cyme or a double biparous or uniparous cyme, $7.2\text{--}8 \times 2.2\text{--}2.5(4.5)$ cm, with 2 to 4 pairs of first order

paraclades; rachis glandular-pubescent; internodes 0.8–1 cm long; first order hypopodia 0.2–0.3 cm long, biparous or uniparous; second order hypopodia 1.3–2.2 cm long, uniparous; third order hypopodia ca. 0.2 cm long, uniparous; fourth order hypopodia lacking; congested terminal paraclade 0.6–1.2 cm long with 5 to 8 flowers per cm; bracts 2.5–5.0 \times 0.8–0.9 mm, narrowly elliptic, the apex acute to acuminate, dorsally glandular pubescent. Hypan-

thium $1.5\text{--}2.2 \times 1\text{--}1.2$ mm, with spiral tracheids in parenchyma, externally densely glandular-pubescent, internally glabrous or with few glandular trichomes; petals ca. $2.5 \times 0.8\text{--}0.9$ mm, narrowly elliptic, base cuneate, apex acute, without a terminal glandular trichome, dorsally glabrous; stamens with filaments $2.2\text{--}2.5$ mm long, anthers $1.2\text{--}1.8$ mm long, purple, pedoconnective ca. 0.1 mm long; ovary with apex glandular pubescent. Fruit capsular, $1.5\text{--}2.2 \times 1\text{--}1.5$ mm, bilocular, the ovary wall chartaceous; seeds ca. $0.4 \times 0.2\text{--}0.3$ mm.

Flowering and fruiting. *Aciotis wurdackiana* flowers and fruits from May to July.

Distribution and habitat. Despite the wide distribution of *Aciotis* species in Brazilian Amazonia, *A. wurdackiana* occurs only in a small area in the northwestern part of Pará State and occupies disturbed areas along rivers, secondary forests, and wet areas on white sands from 10 to 760 m elevation.

Variation and affinities. *Aciotis wurdackiana* is similar to *A. annua*, *A. polystachya* (Bonpland) Triana, and *A. ornata* (Miquel) Gleason because of the root-like bases of the trichomes, the spiral tracheids in the hypanthial parenchyma, and the dry fruit. The pubescence of the stems and the wider ovate leaf distinguishes *A. annua* from *A. wurdackiana*. *Aciotis polystachya* differs from *A. wurdackiana* by the stems densely covered with glandular trichomes, and by the much smaller bracts; *A. ornata* is different from *A. wurdackiana* by the stems densely covered by lanose and reddish trichomes and by much bigger leaves with an obtuse apex.

The specific epithet *wurdackiana* honors the late John J. Wurdack (1921–1998), a well-known botanist who worked tirelessly with Neotropical Melastomataceae.

Paratypes. BRAZIL Pará: Rio Trombetas, Cachoeira Porteira, próxima a foz do rio Mapuera, 18 June 1980, Martinelli 7039 (INPA, NY, US); 4 km S of Cachoeira Porteira, June 1974, Campbell et al. P22526 (GH, INPA, K, NY, S, US); Municipio Oriximiná, Cachoeira Porteira, km 5, 18 June 1980, Cid & Ramos 1038 (F, GH, INPA, MICH, NY, US), 18 June 1980, Davidson & Martinelli 10364 (INPA, NY, US), 5 June [19xx], Silva & Santos 4708 (NY, US).

Aciotis olivieriana Freire-Fierro, sp. nov. TYPE: Colombia. Meta: Villavicencio $04^{\circ}09'N$, $73^{\circ}37'W$, 500 m, 19 Mar. 1939, A. H. G. Alston 7650 (holotype, US; isotypes, BM, COL, NY, S). Figure 2.

Planta erecta usque subprostrata, caule trichomatibus glandulosis pubescente; xylemate tracheidis spiraliformibus destituto. Folia cordiformia, subtus striis retiformibus

destituta. Inflorescentia ex cyma duplo bipara constans; bracteis inconspicuis. Fructus capsularis. Haec species ab *A. polystachya* foliis subtus striis retiformibus destitutis atque xylemate tracheidis spiraliformibus destituto, ab *A. viscosa* foliis minoribus membranaceis atque cymis duplo biparis differt.

Plant 14–30 cm high, erect to prostrate; stolons present or absent; stem quadrangular with inconspicuous wings, glandular pubescent with trichomes < 0.5 mm long. Leaves with petiole (0.3–) 1.3–3.2 cm long, narrowly winged, glandular-pubescent with trichomes < 1 mm long; blade 1.5–3(–5) \times (1–)2.3–2.8(–3.6) cm, membranous, cordiform, 7-veined, the base cordate, the apex acute to acuminate, the margin serrulate, upper leaf surface dark green, pubescent with whitish eglandular adpressed trichomes, lower surface light green, pubescent, with eglandular adpressed trichomes. Inflorescence a double biparous cyme (rarely a thyrsse), 6–14 \times (3–)4–5.5(–7) cm, with 2 or 3 pairs of first order paraclades; rachis glandular pubescent; internodes 1.5–3 cm long; first order hypopodia 1–1.5 cm long, biparous; second order hypopodia 0.3–0.7 cm long, biparous or uniparous; third order hypopodia 0.2–0.5 cm long, uniparous (rarely biparous); fourth order hypopodia lacking; terminal paraclade 1–2.5 cm long with 2 or 3 flowers per cm; bracts 0.8–1.5 \times 0.2–0.5 mm, triangular, the apex acuminate, dorsally glabrous. Hypanthium ca. $1.5 \times 1\text{--}1.8$ mm, without spiral tracheids in parenchyma, externally with few glandular trichomes, internally glabrous; petals ca. 2.5×1 mm, obovate, base cuneate, apex obtuse, without a terminal glandular trichome, dorsally glabrous; stamens with filaments 2–2.5 mm long, anthers 1.5–2 mm long, purple, pedoconnective lacking or ca. 0.1 mm long; ovary with apex glandular-pubescent. Fruit a capsule, $2.2\text{--}2.5 \times 1.5\text{--}1.8$ mm, bilocular, the ovary wall coriaceous; seeds 0.3–0.4 \times ca. 0.25–0.3 mm.

Flowering and fruiting. *Aciotis olivieriana* flowers and fruits from March to June and again from August to January.

Distribution and habitat. This species has been collected in western Venezuela, northwestern Brazil, and eastern Colombia, Ecuador, and Peru. It inhabits riverbanks and primary forests at 125 to 1350 m elevation.

Variation and affinities. *Aciotis olivieriana* is similar to *A. polystachya* and *A. viscosa* (Bentham) Freire-Fierro by the glandular trichomes on the stems and the cordate leaves. However, *A. olivieriana* differs from *A. polystachya* in the absence of the running sclerenchyma fibers on the leaf undersurface, the lack of trichomes with root-like bases,

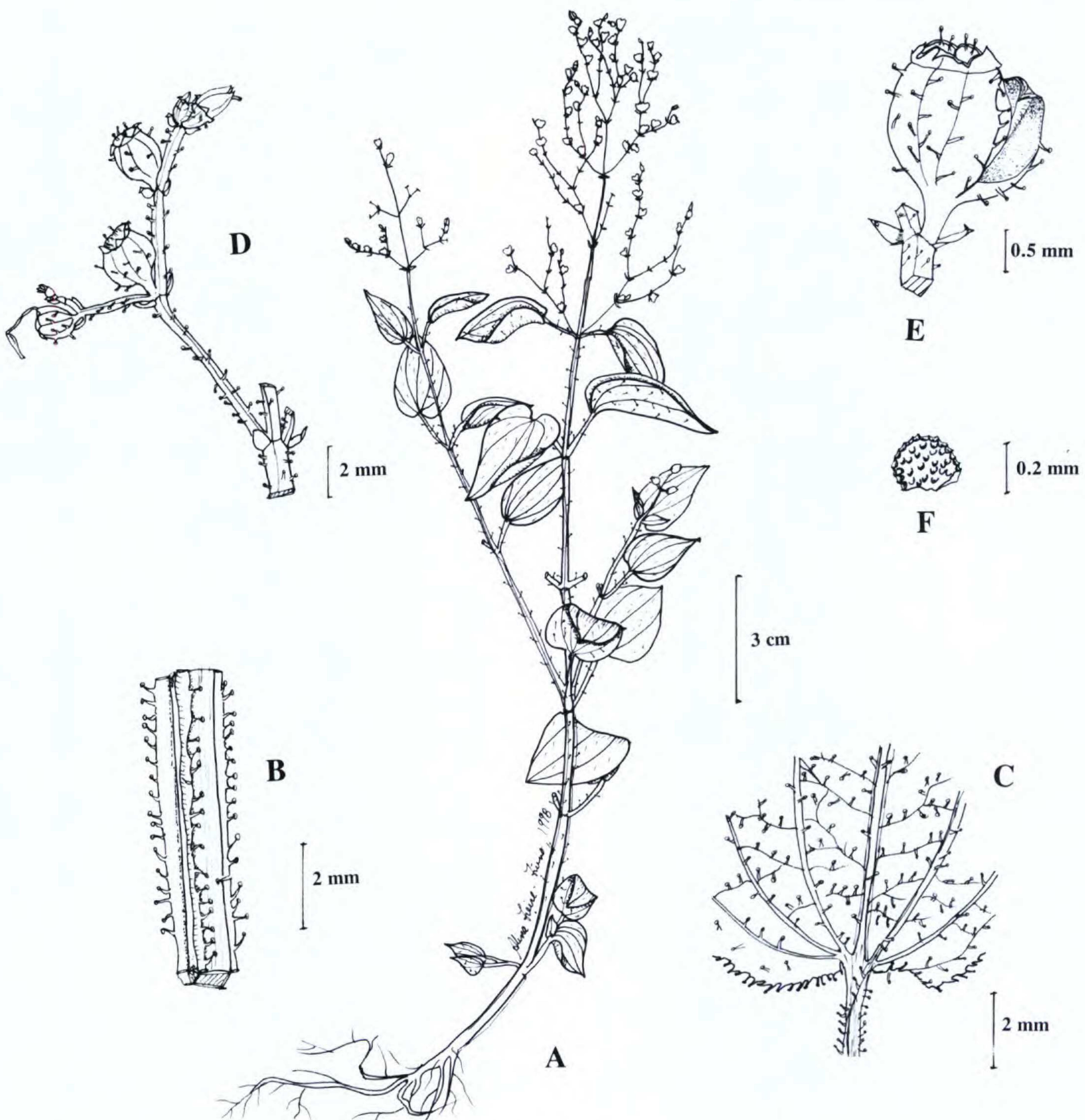


Figure 2. *Aciotis olivieriana* Freire-Fierro. —A. Habit. —B. Stem. —C. Lower surface of leaf. —D. Inflorescence. —E. Open capsular fruit. —F. Seed with foveolate testa. (From Sastre 968.)

and the lack of spiral tracheids; it differs from *A. viscosa* in its smaller and membranous leaves, doubly cymose inflorescences, and the absence of glandular trichomes on the dorsal surfaces of petals. Similarly, *A. olivieriana* could be confused with some representatives of *A. acuminifolia* that have cordate leaves, but it differs from the latter in having 7-veined leaves, glandular trichomes on the stems and petioles, and elongated anthers lacking pedoconnectives. Because of these morphological similarities, *Aciotis olivieriana* has usually been misidentified as *A. polystachya* or *A. acuminifolia*, delaying, therefore, the recognition of this new species.

Like *Aciotis wurdackiana*, *A. olivieriana* has also been collected in the state of Pará (Brazil), but it differs from the former in the cordate leaves, elongated and lax inflorescence, and absence of trichomes with root-like bases.

Vernacular name. Daicap (Amazonas, Peru).

Mathies (1981, unpublished Ph.D. thesis) originally described this species using the epithet "olivierii," honoring his wife Shirley Olivier Mathies.

Paratypes. BRAZIL. AMAZONAS: São Gabriel da Cachoeira, Rio Negro, 1852, Spruce 2123 (BM, K, M, NY, US), 5 Sep. 1981, Renner 363 (INPA); upper Rio Negro, Manaus-Caracarai, km 45, 28 May 1984, Renner 955 (AAU); Reserva Forestal Ducke, Manaus-Itacoara, km 26,

Floresta de Vertente, 25 Apr. 1995, *Sothers 417* (INPA); km 26, Estação de Meteorologia, June 1997, *Sothers 1011* (INPA); Manaus, estação da Silvicultura, INPA km 45, 26 May 1984, *Miranda et al. 218* (INPA); Waupes, Rio Negro, 21 Dec. 1964, *Vogel et al. 341* (INPA, US). **Pará:** Rio Trombetas, Porteira, 8 June 1974, *Campbell et al. P22492* (K, MG, NY, S, US). **COLOMBIA.** **Meta:** Villavicencio, 1 Jan. 1856, *Triana 6195a* (BM); río Guatiquía, 20 Nov. 1948, *Araque & Barkley 18M34* (COL, US); Sierra La Macarena, Bocas del río Duda, 30 Oct. 1975, *Idrobo 8365* (COL); El Mico Airstrip (Camp 1), 13 Nov. 1949, *Philipson et al. 1401* (BM, COL, NY [2 sheets], US); opposite Hda. San Carlos, 29 Jan. 1944, *Hermann 11133* (COL, NY, US), 12 Oct. 1938, *Cuatrecasas 1995* (NY, US), 12 Oct. 1938, *Cuatrecasas 3505* (F); toward El Parrao, 10 Nov. 1938, *Cuatrecasas 4584* (F, US); Sabanas de San Juan de Arama, Dec. 1950, *Idrobo & Schultes 579* (COL [2 sheets]); Río Sardinata, Mar. 1971, *Sastre 968* (COL). **Putumayo:** 2 Dec. 1980, *Croat 51747* (COL, MO). **Vau-pés:** San Felipe, 21 Nov. 1948, *Romero-Castañeda 1213* (COL, NY). **ECUADOR.** **Napo:** between Tena and Napo, 6 Oct. 1939, *Asplund 9349* (S); about 11 km ESE of Puerto Misahualli, ca. 3 km E of Jatun Sacha, 2 June 1988, *Renner 69334* (AAU); Tena, Hacienda Dos Ríos, Río Misahualli; Archidona, 12 May 1933, *Heinrichs 416* (G [2 sheets], M, NY, Z [2 sheets]). **Zamora Chinchipe:** Macas, 19 Mar. 1956, *Asplund 19836* (S). **PERU.** **Amazonas:** Labanda, Huampami, Rio Cenepa, 3 Aug. 1974, *Ancuash 696* (GH, XAL). **San Martín:** Tarapotó, 1856, *Spruce s.n.* (K). **VENEZUELA.** **Amazonas:** San Carlos de Río Negro, Apr. 1970, *Steyermark & Bunting 102703* (US); Alto Río Orinoco, Isla Quiratare and Esmeraldas, 22 Mar. 1953, *Maguire & Wurdack 34625* (K, NY, US); Mavaca, Alto Orinoco, Indios Guaicas (Yanomanö), Jan. 1970, *Aristeguieta & Lizot 7384* (NY, US), 1984, *Stergios & Aymard 7265* (MO, US). **Bolívar:** Salto Pará, Aug. 1991, *Meier 240* (US). **Distrito Federal:** Caracas, s.d. *Landsberge van 19* (S).

Acknowledgments. I thank FUNDACYT (Fundación para la Ciencia y la Tecnología del Ecuador)-LASPAU, the University of Missouri-St. Louis,

the Missouri Botanical Garden, the California Academy of Sciences, the Pontificia Universidad Católica del Ecuador, and the Herbario Nacional del Ecuador for their help. I thank also the curators of A, AAU, AMES, BHCB, BM, BR, C, CAS, CAY, COL, CR, DS, E, F, G, GB, GH, GUA, HB, HRB, HUA, IJ, INPA, K, LL, LPB, M, MA, MBM, MEXU, MG, MICH, MO, NY, QCA, QCNE, R, RB, S, SPF, TEX, TRIN, UC, UEC, US, VEN, W, WIS, XAL, and Z for their help with material of *Acicotis*. I thank also Roy Gereau (MO) and Javier Fernández-Casas (MA) for their help with the Latin diagnoses, and Charlotte Taylor (MO) for her suggestions on the manuscript. P. Mick Richardson helped me extensively during my stay at the Missouri Botanical Garden. My beloved husband Joseph C. Welling, together with my families, the Wellings and the Freire-Fierros, have been of great support for me.

Literature Cited

Cogniaux, C. A. 1891. Melastomaceae. Pp. 1–1256 in A. & C. de Candolle (editors), Monogr. Phan. 7.
 Freire-Fierro, A. In press. Revision of *Acicotis* (Melastomataceae). Syst. Bot. Monogr.
 Mathies, P. S. 1981. A Revision of *Acicotis* (Melastomataceae). Ph.D. Dissertation, Mississippi State University, Starkville, Mississippi. [Unpublished.]
 Metcalfe, C. R. & L. Chalk, with the assistance of M. M. Chattaway [and others]. 1972. Anatomy of the Dicotyledons: Leaves, Stem, and Wood in Relation to Taxonomy, with Notes on Economic Uses. Clarendon Press, Oxford.
 Renner, S. S. 1993. Phylogeny and classification of the Melastomataceae and Memecylaceae. Nordic J. Bot. 13: 519–540.
 Solereder, H. 1908. Systematic Anatomy of the Dicotyledons: A Handbook for Laboratories of Pure and Applied Botany. Translated by L. A. Boodle & F. E. Fritsch; revised by D. H. Scott. Clarendon Press, Oxford.